Message

From: Timothy Janke [Timothy.Janke@tceq.texas.gov]
Sent: 4/30/2020 1:37:36 PM
To: Imhoff, Robert [imhoff.robert@epa.gov]
CC: Daphne McMurrer [Daphne.McMurrer@tceq.texas.gov]; zhaohua.fang@tceq.texas.gov; Feldman, Michael [Feldman.Michael@epa.gov]
Subject: Re: SO2 Technical Results

Bob,

Thank you very much for providing this information. We will contact you if we have any questions.

Thank you,
Tim

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From: Imhoff, Robert <imhoff.robert@epa.gov>
Sent: Thursday, April 30, 2020 7:08 AM
To: Timothy Janke <Timothy.Janke@tceq.texas.gov>
Cc: Daphne McMurrer <Daphne.McMurrer@tceq.texas.gov>; Zhaohua Fang <zhaohua.fang@tceq.texas.gov>; Feldman, Michael <Feldman.Michael@epa.gov>
Subject: RE: SO2 Technical Results

Hi Tim,
As we discussed on the call yesterday, EPA has chosen to use a weight of evidence approach for the proposal for the clean data determination for the two Texas nonattainment areas whose sources are now shutdown. Our weight of evidence includes available monitoring and modeling data, the changes in the federally-enforceable emissions limits, and the emissions trends in the nonattainment areas.

I've summarized the results of our analysis below. If you have any questions concerning our analysis or results, we can set up a call to discuss.

Best Regards,
Bob

Summary of EPA Results from Clean Data Determination Analysis for the Freestone/Anderson and Titus County Nonattainment Areas

Monitoring Results

Texas sited and began operating a monitor around the Big Brown power plant (Freestone/Anderson Counties) on October 30, 2017. In December 2017, Vistra Energy submitted information regarding the planned retirements of the Big Brown (Freestone/Anderson Counties) and Monticello (Titus County) facilities. Though the Big Brown power plant shut down in February 2018, Texas is currently continuing to operate the monitor. The EPA anticipates that the monitor will

not have three years of monitoring data necessary to fully evaluate compliance with the SO2 NAAQS, relying solely on the monitoring data, until the end of calendar year 2020. The monitor planned near the Monticello power plant (Titus County), was not installed once the retirement of the facility was announced. However, approximately 16 km away in Titus County, Texas sited and began operating a DRR monitor near the Welsh Power Plant in January 2017.

The monitoring data indicate that the areas are in attainment. Normally, EPA requires three years of complete, certified monitoring data to support a determination of clean air in an area designated as nonattainment. This data is used to determine a design value, that is the measure of concentration characterized as defined statistically by the standard. For the 2010 one-hour SO_2 standard, the statistical measure is the three-year average of the 4th-high annual daily maximum concentration, representing the 99th percentile of concentrations. A three-year period is used to smooth out variability in concentrations from year to year due to changes in source emission rates or to meteorological effects on dispersion.

In our analysis the Freestone and Anderson County nonattainment area is represented by the Big Brown DRR monitor and the Titus County nonattainment area is represented by the Welsh DRR monitor located approximately 16 km to the east of the nonattainment area, also in Titus County.

The DRR monitor at Big Brown began reporting data to AQS October 30, 2017. Until the Big Brown plant ceased operation on February 14, 2018 the monitor was recording impacts from Big Brown during this initial 107-day period. During this period the 99th percentile concentration (the 1st high value for this shorter-than-one-year period) was 77.5 ppb, slightly above the standard. After the shutdown of Big Brown, the monitor's measurements represent the impact from the other remaining SO_2 sources across the region. Post-shutdown, 321 days were measured during 2018; during this period the 99th percentile concentration was 14 ppb (the 3rd high value), 19% of the standard. The 99th percentile concentration for 2019 (the 4th high value) is 5.8 ppb, 8% of the standard. The extremely low 99th percentile concentrations post-shutdown indicate that the 99th percentile concentrations in the Freestone and Anderson County nonattainment area are now well below the NAAQS. The Big Brown Monitor only has valid data for two complete years. EPA is considering the shorter period of monitoring for Big Brown because the primary source contributing to nonattainment has been shut down and recent monitoring data showing low concentrations that have been measured and additional supporting data as detailed below.

For the Titus County nonattainment area, the EPA relied upon monitoring data from the Welsh DRR monitor also located in Titus county approximately 16 km to the east of the nonattainment area surrounding the Monticello Electric Station. Unlike the Big Brown Monitor, the Welsh Monitor has 3 years of complete, certified monitoring data. The Welsh monitor is sited at the point of maximum impact from the fully operational Welsh Power Plant (in order to characterize the impacts from that plant). However, the Welsh monitor can still be relied upon to conservatively estimate concentrations of SO_2 (that is, likely an overestimate of concentrations) and to characterize the air quality in the Titus County nonattainment area around the Monticello Electric Station.

According to Appendix W 8.3.3 bii the maximum concentration from an elevated point source is generally within 10 times the height of the stack(s) at that source[1]. Since the stack height of Welsh's boilers is 161 m, the maximum concentration would be expected to occur less than 2 km from the stacks. As the Titus County nonattainment area is approximately 16 km away, lesser concentrations in the nonattainment area from the Welsh emissions are expected. An alternative estimate of the air quality in the Titus County nonattainment area can be made by excluding the Welsh monitor's SO_2 data when winds blow from the Welsh Plant to the monitor, effectively removing Welsh's contribution to the concentrations. This approach allows the characterization of the impact from all other sources in the region at the Welsh monitor. This type of analysis is suggested by the NO_2 clarification memo[2] to determine background concentrations, used to characterize surrounding source concentrations, when a monitor is impacted by a nearby point source. However, screening the data to exclude Welsh's impacts could underestimate the design value concentrations within the Titus County nonattainment area because the Welsh power plant is expected to have some level of impact in on the Titus County nonattainment area. Alternatively, considering the full data from the Welsh monitor, produces a conservative upper limit of concentrations (that is, likely an overestimate of concentrations) in the Titus County nonattainment area. Therefore, to more accurately characterize the air quality, the EPA examined both the screened concentrations to give a lower limit of the concentrations in the Titus County nonattainment area and the full data concentrations to give a conservative upper limit of concentrations in the Titus County nonattainment area.

The DRR monitor at Welsh began reporting data to AQS on January 1, 2017. Examining screened data, during 2017, when Monticello and Big Brown were still operational, shows impacts from the direction of Big Brown at the monitor. The highest concentration monitored was 112.7 ppb when winds were blowing from the direction of Big Brown. The daily maximum 99th percentile concentration during 2017 was 33.4 ppb. During 2018-2019, when Big Brown had shut down, the highest concentration measured at the monitor was 38.9 ppb and the 99th percentiles considering all data for 2018 and 2019 were 20.2 and 30.5 ppb respectively. Considering full data for the Welsh monitor, including 2017 when impacts from pre-shutdown Big Brown were monitored, the design value for the most recent three years of complete, quality assured, and certified ambient air monitoring data from the 2017–2019 monitoring period is 28 ppb, 37% of the standard. This design value represents an upper limit for the design value for the Titus County nonattainment area.

Considering the screened data (when the wind was not blowing from Welsh), the daily maximum 99th percentile concentrations in 2018 and 2019 were 15.8 and 12.9 ppb respectively. A lower limit for the 2017-2019 3-year design value for the Titus County nonattainment area is 21 ppb, 28% of the standard. Both the upper- and lower-limit 2017-2019 design value estimates for the Titus County nonattainment area are less than ½ of the NAAQS, even when including apparent impacts from the two Vistra Energy plants that were shut down after 2017.

99TH PERCENTILE 1-HOUR AVERAGE IN PARTS PER BILLION (PPB) AT THE Welsh and Big Brown MONITORs
[2017-2019]

Monitor	Site name	2017	2018	2019	Average
48-449-1078	Welsh DRR – All Data	33.4	20.2	30.5	28[1]
48-449-1078	Welsh DRR – Screened Data[2]	33.4	15.8	12.9	20.7
48-161-1084	Big Brown DRR - All Data[3]	77.5	39.4	5.8	21.6[5]
48-161-1084	Big Brown DRR - Screened Data[3]	2.8[4]	14	5.8	9.5[5]

1. The 3-year average of the yearly 4th high of the complete and certified data from the Welsh monitor is represents the design value for the monitor.
2. Excluding wind directions from Welsh Power Plant 124-214°
3. Excluding wind directions from Big Brown 193-283° prior to the shutdown of Big Brown on 2/14/2018. As reported in the text, the 99th percentile during the period of Big Brown operation was 77.5 ppb.
4. 99th Percentile - First high value for period 10/30/17 – 12/31/2017 Excluding wind directions from Big Brown 193-283°. The monitor began reporting data 10/30/2017.
5. Average is weighted by number of days included for each year

Modeling Results

For the SO2 designations in the two Texas areas addressed in this action, the EPA considered available air quality monitoring data from calendar years 2013-2015, and modeling submitted by Vistra Energy and the Sierra Club in March 2016. The modeling runs considered the impacts of actual emissions (consistent with the modeling TAD) for the 3-year period of 2013-2015. The modeling submitted by the Sierra Club was found by EPA to substantially adhere to the TAD despite some deviations. The Sierra Club's final modeling demonstrated that both Big Brown and Monticello emissions could cause violations of the NAAQS in an area surrounding each plant. The contributions from all sources other than the Luminant power plant in each area were represented in the model by background concentrations. These contributions from all other sources were small, 2 ppb for both areas. EPA found that the technical analysis demonstrated that the Big Brown and Monticello plants were the key contributors to the modeled 2010 SO2 NAAQS violations.

The EPA finds the Sierra Club's modeled source inventory was created in accordance with the 2014 SO_2 Nonattainment Area Guidance and the 2016 SO_2 Modeling TAD. Since the Sierra Club sufficiently considered all significant sources of SO_2 emissions for inclusion in the modeling demonstration, and that these sources now have zero emissions no new modeling is required to demonstrate attainment of the standard. Since the emissions from the Vistra Energy DRR Sources are zero and thus their modeled concentrations would also be zero, the total concentration within the nonattainment area would be modeled as equal to the contribution from all other sources. The modeled design value in the absence of emissions from the DRR sources would then be equal to the concentrations from all other sources as represented by the background concentration of 2 ppb.

Also, implicit in the use of background concentrations to represent all other sources in the modeling is that the concentration gradients in the nonattainment areas due to all other sources are low and that a single monitor can represent the air quality for a large area.

Emissions Inventory Trends

In the Freestone and Anderson Counties area, Big Brown Steam Electric Station ("Big Brown") was the largest source of SO2 emissions in the area, but recently and permanently suspended operations as of January 2018, and the majority of its New Source Review (NSR) permits were voided on March 29, 2018, and its operating permit was voided August 3, 2018. In Titus County, Monticello Steam Electric Station ("Monticello") was the largest source of SO2 emissions in the area, but recently and permanently suspended operations as of February 2018 and the majority of its NSR permits were voided on February 14, 2018 and its operating permit was voided on August 3, 2018.

As noted earlier, the 2014 SO2 Nonattainment Area Guidance states that, in order for the EPA to make a clean data determination, the state may need to submit information in addition to monitoring data if the monitor is not located at the location of maximum concentrations. In March 2016, Sierra Club submitted modeling data for the then most recent three years (2013–2015). EPA reviewed 2016- 2019 emissions data from the Clean Air Markets Database (CAMD) in review of assumptions made in the 2013–2015 modeling demonstration. As shown in the table below, beginning in the second quarter of 2018 both plants' emissions are omitted in CAMD, indicating no SO2 emissions. Overall during the modeled period 2013-2015 Big Brown emitted 169,791 and Monticello emitted 63,230 tons of SO2. In the most recent three-year period, 2017-2019, they emitted 54,291 and 29,410 tons respectively, less than ½ the average emission rates modeled. The EPA reviewed the Sierra Club modeling data and supporting 2017-2019 emissions data information for the nonattainment area to determine consistency with the EPA's Clean Data Policy, the 2014 SO2 Nonattainment Area Guidance and the 2016 SO2 Modeling TAD.

Quarterly Emissions from Big Brown and Monticello for 2013 – 2019.

Quarter	Big Brown SO_2 Emissions (tons)	Monticello SO_2 Emissions (tons)
2013 Q1	16,179	2,131
2013 Q2	14,603	7,358
2013 Q3	16,817	12,130
2013 Q4	14,895	2,778
2014 Q1	12,792	5,607
2014 Q2	13,119	3,683
2014 Q3	19,477	11,147
2014 Q4	12,072	2
2015 Q1	12,430	0
2015 Q2	11,677	4,205
2015 Q3	12,994	8,760
2015 Q4	12,737	5,430
2016 Q1	9,632	2,622
2016 Q2	7,369	3,853
2016 Q3	14,556	11,191
2016 Q4	10,913	7,293
2017 Q1	9,904	3,463
2017 Q2	10,244	8,558
2017 Q3	13,203	8,358
2017 Q4	14,282	9,030
2018Q1	6,659	0
2018Q2	0	0
2018Q3	0	0

2018Q4	0	0
2019Q1	0	0
2019Q2	0	0
2019Q3	0	0
2019Q4	0	0

From: Timothy Janke <Timothy.Janke@tceq.texas.gov>
Sent: Wednesday, April 29, 2020 11:13 AM
To: Imhoff, Robert <imhoff.robert@epa.gov>
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Subject: SO2 Technical Results

Robert,

As discussed on the conference call this morning, could you please forward your draft technical results from your studies related to SO_2 modeling, monitoring, and emissions in the vicinities of the Big Brown and Monticello power plants? By comparing your results to our preliminary information and addressing any potential discrepancies at this stage, we could limit or eliminate any uncertainties down the road.

Would you like us to set up a call (with just data analysis staff) so we could discuss this comparison?

Thank you very much.

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[1] Appendix W reference. FR Vol. 82, No. 10
[2] NO2 clarification memo reference